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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/974,637	10/09/2001	Ashok K. Agarwal	72162-243315	9924

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EXAMINER

MENON, KRISHNAN S

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/974,637

Applicant(s)

AGARWAL, ASHOK K.

Examiner

Krishnan S Menon

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ed

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 12-24 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chau et al (US 4,983,291).

Chau teaches a filtration membrane as in the instant claims as follows:

Claims 12 and 22: A filtration membrane for separating a contaminant from a feed fluid to produce a product fluid, said membrane comprising:

a porous substrate having a first surface and a product permeable-permeable layer cast on said first surface of said porous substrate, said layer comprising the interfacial polymerization reaction product of an aqueous amine solution and an acyl halide solution (abstract; col 3 line 5-col 4 line 25),

wherein said aqueous amine solution includes an amine, propionic acid and a non-amine base, and said acyl halide solution includes an acyl halide and an organic solvent (product by process: the contents of the solutions for the reaction do not form part of the membrane structure. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product

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itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re *Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)).

Re the limitation of rejection of Mg sulfate and flux, this would be inherent because the membrane has same structure. Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection. "There is nothing inconsistent in concurrent rejections for obviousness under 35 U.S.C. 103 and for anticipation under 35 U.S.C. 102." In re *Best*, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA 1977). This same rationale should also apply to product, apparatus, and process claims claimed in terms of function, property or characteristic. Therefore, a 35 U.S.C. 102/103 rejection is appropriate for these types of claims as well as for composition claims.

Claim 13: The filtration membrane according to claim 12, wherein said layer has pores of a size suitable for nanofiltration (inherent: membranes made from piperazine forms nano-filtration membrane – specification page 5 line 1; Chau teaches using piperazine in col 5 line 26; similar composition. Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference,

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the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection. "There is nothing inconsistent in concurrent rejections for obviousness under 35 U.S.C. 103 and for anticipation under 35 U.S.C. 102." In re Best, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA 1977). This same rationale should also apply to product, apparatus, and process claims claimed in terms of function, property or characteristic. Therefore, a 35 U.S.C. 102/103 rejection is appropriate for these types of claims as well as for composition claims.)

Claim 14: The filtration membrane according to claim 12, wherein said layer has pores of a size suitable for reverse osmosis filtration (examples).

Claims 15 and 23: The filtration membrane according to claim 12, wherein said amine is one of piperazine and m-poly(phenylenediamine) (col 5 line 26-35).

Claims 16 and 24: The filtration membrane according to claim 12, wherein said non-amine base is sodium hydroxide (col 5 lines 45-49).

Claim 17: The filtration membrane according to claim 12, wherein said aqueous amine solution is prepared by dissolving said amine and a propionate salt in water (product by process - In re Thorpe).

Claim 18: The filtration membrane according to claim 12, wherein said acyl halide is trimesoyl chloride (col 5 lines 50-67).

Claim 19: The filtration membrane according to claim 12, wherein said organic solvent is immiscible in water (product by process - In re Thorpe).

Claim 20: The filtration membrane according to claim 19, wherein said organic solvent is naphtha (product by process - in re Thorpe).

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Claim 21: The filtration membrane according to claim 12, wherein said porous substrate is comprised of polysulfone (col 5 line 16).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chau et al (US 4,983,291) in view of Koo et al (US 6,245,234 B1).

Chau et al teaches the elements of claim 1 as follows: A method for producing a filtration membrane, the method comprising (abstract, col 3 line 5 – col 6 line 15):

applying an aqueous amine solution to a surface of said porous substrate (col 5 lines 20-25), said aqueous amine solution including an amine (col 5 lines 25-35), propionic acid and a non-amine base (col 5 lines 45-49)

applying an acyl halide solution to be in contact with said aqueous amine solution along an interface' said acyl halide solution including an acyl halide and an organic solvent(col 5 line 50-col 6 line 14); and

causing polymerization to occur at said interface.

Chau does not teach using propionic acid in the amine solution. Koo teaches use of propionic acid in the amine solution (col 7 lines 3-11) in the process of making a high-flux semipermeable membrane using a multifunctional amine and a multifunctional

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acid chloride. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Koo in the teaching of Chau for improved flux and salt rejection in low pressure applications (Koo col 4 lines 6-11).

Claims 2-11 have further added limitations which are taught by Chau as follows:

Claim 2: The method according to claim 1, wherein applying said aqueous amine solution includes wetting a portion of said porous substrate with said aqueous amine solution (col 5 lines 20-25).

Claim 3: The method according to claim 1, wherein said aqueous amine solution is applied in a layer having a first surface in contact with said substrate and a second surface, and further wherein said acyl halide solution is applied to be in contact with said second surface to form said interface (col 5 lines 50-67).

Claim 4: The method according to claim 1, wherein said amine is one of piperazine and m-poly(phenylenediamine) (col 5 lines 25-35).

Claim 5: The method according to claim 1, wherein said non-amine base is sodium hydroxide (col 5 lines 45-49).

Claim 6: The method according to claim 1, further including preparing said aqueous amine solution from said amine and a propionate salt (see Koo as in claim 1).

Claim 7: The method according to claim 1, wherein said acyl halide is trimesoyl chloride (col 5 lines 60-62).

Claim 8: The method according to claim 1, wherein said organic solvent is immiscible in water (col 6 lines 10-14).

Claim 9: The method according to claim 8, wherein said organic solvent is naphtha (col 6 line 12).

Claim 10: The method according to claim 1, wherein said porous substrate is comprised of polysulfone (col 5 lines 13-19).

Claim 11: The method according to claim 1, further including drying said membrane after said polymerization has occurred. (col 7 lines 22-27)

Response to Arguments

Applicant's arguments filed 12/29/03 have been fully considered but they are not persuasive.

Argument re the additional limitation in claim 12: The flux and rejection of Mg-sulfate solution would be inherent in the membrane as pointed out in the rejection. Comparison of the sodium chloride rejection and flux values from Chau reference are not relevant because the data in Chau reference is based on metaphenylene diamine as the polyamine, where as the applicant's data is based on piperazine as the amine (see bottom paragraph of specification), and the results of rejection of sodium chloride would be different from that of Mg-sulfate.

Re the argument about claims 1-11, that Koo ref premixed propionic anhydride with amine before adding to the aqueous solution, the order of addition is prima facie obvious (Ex parte Rubin , 128 USPQ 440 (Bd. App. 1959) (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to

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render prima facie obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results); *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is prima facie obvious.)). Propionic anhydride would hydrolyze to acid in aqueous solution.

Re the argument of "unexpected results", applicant must provide evidence to the fact for consideration.

Argument re Koo ref providing only 50gfd flux, etc: again, not relevant because the results are not obtained from similar conditions as stated above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Krishnan Menon
Patent Examiner


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